FORM PTO-1390 (Modified) (REV 11-2000) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: NAK1-BO68

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.5): 09/831220

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/JP99/06001	29 October 1999 (29.10.99)	10 November 1998 (10.11.98)

TITLE OF INVENTION
DEFLECTION YOKE AND COLOR PICTURE TUBE COMPRISING THE SAME

APPLICANT(S) FOR DO/EO/US
MATSUSHITA ELECTRONICS CORPORATION

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
   a. ☐ is attached hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☒ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☒ Certificate of Mailing by Express Mail
23. ☒ Other items or information:

REVISED SPECIFICATION AND CLAIMS UNDER ART. 34

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/831220	PCT/JP99/06001	NAK1-BO68

24. The following fees are submitted:.

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

		CALCULATIONS PTO USE ONLY
☐	Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1000.00**	
☒	International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$860.00**	
☐	International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$710.00**	
☐	International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$690.00**	
☐	International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**	
	ENTER APPROPRIATE BASIC FEE AMOUNT =	**$860.00**
	Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).	**$0.00**

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	22 - 20 =	2	x $18.00	**$36.00**
Independent claims	3 - 3 =	0	x $80.00	**$0.00**
Multiple Dependent Claims **(check if applicable)**.			☐	**$0.00**
	TOTAL OF ABOVE CALCULATIONS =			**$896.00**
☐	Applicant claims small entity status. (See 37 CFR 1.27). The fees indicated above are reduced by 1/2.			**$0.00**
	SUBTOTAL =			**$896.00**
	Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). +			**$0.00**
	TOTAL NATIONAL FEE =			**$896.00**
☒	Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) **(check if applicable).**			**$40.00**
	TOTAL FEES ENCLOSED =			**$936.00**
			Amount to be: refunded	$
			charged	$

a. ☒ A check in the amount of **$936.00** to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **16-2462** A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Joseph W. Price, Reg. No. 25,124
PRICE and GESS
2100 S.E. Main Street, Suite 250
Irvine, CA 92614

SIGNATURE

Joseph W. Price
NAME

25,124
REGISTRATION NUMBER

May 7, 2001
DATE

NAK1-BO68

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Examiner:
Etsuji Tagami	Group Art Unit:
Serial No.:	
Filed:	May 3, 2001
For: DEFLECTION YOKE AND COLOR PICTURE TUBE COMPRISING THE SAME	Irvine, California 92614

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Prior to an examination on the merits of the above-identified application, please enter the following amendments:

IN THE SPECIFICATION:

Please replace the paragraph beginning on page 1, line 21, with the following rewritten paragraph:

--As shown in this drawing, a bend-up-less type deflection yoke 6 is composed of a saddle-shaped horizontal deflection coil 11 mounted along the inner surface of an insulating frame 13, and a saddle-shaped vertical deflection coil 12 mounted along and sandwiched between the outer

surface of the insulating frame 13 and a ferrite core 14, and the deflection yoke 6 has a structure in which an electron gun side bend portion 17 of the horizontal deflection coil 11 and the vertical coil 12 (the section in the drawing surrounded by a broken line) substantially lines the outer surface of a CRT funnel 4. Please note that reference numeral 15 in the drawing designates a correction coil which corrects so-called VCR (vertical coma residual) and side beams (R,B) vertical line horizontal mis-convergence that occurs and is provided on the outer surface slightly forward in the electron beam emission direction from a main lens 51 of an electron gun 5. Reference numeral 31 in the drawing designates a member for fixing the correction coil 15 known as a back cover or a small cover (hereafter "back cover 31"), the function of which will be described later.--

Please replace the paragraph beginning on page 7, line 16, with the following rewritten paragraph:

--FIG. 8 is a pattern drawing of vertical line horizontal mis-convergence which occurs in the side beams (R,B);--

Please replace the paragraph beginning on page 7, line 18, with the following rewritten paragraph:

--FIG. 9 is a pattern drawing of mis-convergence of vertical coma residual (VCR);--

Please replace the paragraph beginning on page 12, line 20, with the following rewritten paragraph:

--Each correction coil 15 in the present mode, as shown in FIG. 7, is a conductive wire 24 wound around the U-shaped ferrite core 22, and generates a six-pole magnetic field synchronizing a vertical deflection and performs optimum correction of a VCR of a pattern shown in FIG. 9. In addition, other conductive wire is further wound around each of the

correction coils 15, controlling the magnetic field of the conductive wire and, the correction coils 15 also performs the function of generating a four-pole magnetic field in the same cores 22 and correcting vertical line horizontal mis-convergence of side beams (R,B) shown in the pattern in FIG. 8. The working of the correction coil 15 itself is already well known, therefore an explanation will be omitted. However the correction coil 15 may be structured to correct either one or both of the above-described VCR and vertical line horizontal mis-convergence.—

Please replace the paragraph beginning on page 13, line 12, with the following rewritten paragraph:

--An E-shaped ferrite core 29, as shown in FIG. 10, having conductive wire 24 wound around each leg portion may be used as the correction coil 15. When this kind of E-shaped core 29 is used, as is shown in an example of the structure in FIG. 11, it is desirable to mount a correction coil 15 on both the right side and the left side as seen from the screen side. This case is the same as when the U-shaped core 22 is used in that the correction coil 15 can be constructed to correct the VCR and the vertical line horizontal mis-convergence of the side beams (R,B) by winding different conductive wires around the ferrite core 29 and controlling the magnetic field.—

Please replace the paragraph beginning on page 17, line 21, with the following rewritten paragraph:

--In addition, the applicable range of the present invention is not limited to self convergence system deflection yokes. Even in deflection yokes other than those of the self convergence system, it is possible that it is necessary to set some kind of correction coil at the electron gun side bend portion of the deflection coil, and the technique of the present invention

can be applied in such cases. Consequently, the correction coil 15 is not limited to correcting VCR and side beam vertical line horizontal mis-convergence, but can be applied to various correction coils.--

IN THE CLAIMS:

Please cancel Claims 2, 13, 14, 16, 19, 20 without prejudice.

Please amend the claims as follows:

1. (Amended) A deflection yoke of a bend-up-less type comprising a saddle-shaped horizontal deflection coil, a saddle-shaped vertical deflection coil, an insulating frame, and a correction coil, the saddle-shaped horizontal deflection coil and the saddle-shaped vertical deflection coil being provided along, respectively, an inner and an outer surface of the insulating frame which insulates the deflection coils, and the correction coil being provided above the outer surface of an electron gun side bend portion of the deflection coils, wherein

a setting member is provided integrally formed in a fixed positional relation with respect to the insulating frame on the electron gun side and behind the bend portion of the deflection coils, and the correction coil is set at a fixed position by a positioning fixing member in front of a wall surface of the setting member which faces the screen and above the outer surface of the electron gun side bend portion.

3. (Amended) The deflection yoke of Claim 1 wherein

the positioning fixing member is structured to be freely detachable in relation to the setting member.

4. (Amended) The deflection member yoke of Claim 1 wherein

the correction coil has (a) a core whose leg portion points in a direction toward the electron gun side bend portion of the deflection coil, and (b) a bobbin which covers the core and is conductive wire wound therearound; and

the positioning fixing member is set at a substantially fixed position in relation to the core.

5. (Amended) The deflection yoke of Claim 4 wherein

the setting member has a notch, and

the positioning fixing member has a claw portion which is interlocked with the notch.

7. (Amended) The deflection yoke of Claim 4 wherein

the positioning fixing member has a protruding portion which is inserted in an insertion aperture provided in the setting member.

8. (Amended) The deflection yoke of Claim 4 wherein

the positioning fixing member has a fitting portion which is fitted into a slot provided in the setting member.

9. (Amended) The deflection yoke of Claim 4 wherein

a flange portion is provided at both ends of the bobbin, an edge of each flange portion contacting the setting member.

15. (Amended) A color picture tube having (a) an outer envelope composed of a front panel formed with a phosphor screen surface on an inner surface, and a funnel, (b) an electron gun provided in a neck portion of the funnel, and (c) a deflection yoke mounted on an outer surface of the funnel, wherein

the deflection yoke is of a bend-up-less type and comprises a saddle-shaped horizontal deflection coil, a saddle-shaped vertical deflection coil, an insulating frame, and a correction coil, the saddle-shaped horizontal deflection coil and the saddle-shaped vertical deflection coil being provided along, respectively, an inner and an outer surface of the insulating frame which insulates the deflection coils, and the correction boil being provided above the outer surface of an electron gun side bend portion of the deflection coils, wherein

a setting member is provided integrally formed in a fixed positional relation with respect to the insulating frame on the electron gun side and behind the bend portion of the deflection coils, and the correction coil is set at a fixed position by a positioning fixing member in front of a wall surface of the setting member which faces the screen and above the outer surface of the electron gun side bend portion.

17. (Amended) The color picture tube of Claim 15 wherein

the positioning fixing member is structured to be freely detachable in relation to the setting member.

18. (Amended) The color picture tube of Claim 15 wherein

the correction coil has (a) a core whose leg portion points in a direction toward the electron gun side bend portion of the deflection coil, (b) a bobbin which covers the core and is conductive wire wound therearound; and the positioning fixing member is set at a substantially fixed position in relation to the core.

Please add the following newly drafted Claims 21-28.

21. (New) The deflection yoke of Claim 1 wherein

the wall surface of the setting member which faces the screen is flat.

22. (New) The deflection yoke of Claim 11 wherein

the setting member has a flat plate form, and is integrally formed with the insulating frame so as to be upright from an electron gun side end of the insulating frame.

23. (New) The deflection yoke of Claim 1 wherein

the positioning fixing member is structured so as to be positioned and fixed to the setting member by gripping the perimeter of the setting member.

24. (New) The deflection yoke of Claim 23 wherein

the positioning setting member has a structure in which two opposing rod members extend from the correction coil substantially horizontally in opposite directions, a tip of each rod member is bent around the perimeter of the setting member, and an inner surface of the bend hooks to the perimeter of the setting member.

25. (New) The deflection yoke of Claim 24 wherein

a base end of each of the opposing rod members is secured to an end surface of the core of the correction coil, and a tip of each of the opposing rod members extends along a core rod direction.

26. (New) The deflection yoke of Claim 22, wherein

an aperture is formed in the wall surface of the setting member which faces the screen,

a latch protrusion which latches into the aperture is provided on the positioning fixing member; and

the correction coil is positioned and fixed by inserting the latch protrusion into the aperture.

27. (New) A method of manufacturing for a deflection yoke of a bend-up-less type comprising a saddle-shaped horizontal deflection coil, a saddle-shaped vertical deflection coil, an insulating frame, and a correction coil, the saddle-shaped horizontal deflection coil and the saddle-shaped vertical deflection coil provided along, respectively, an inner and an outer surface of the insulating frame which insulates the deflection coils, and the correction coil being provided above the outer surface of an electron gun side bend portion of the deflection coils, the method for assembling the deflection yoke comprising the steps of

a step for preparing the insulating frame which was integrally formed with the setting member,

a step for providing the horizontal deflection coil on the inner surface of the insulating frame,

a step for providing the vertical deflection coil on the outer surface of the insulating frame, and

a step for setting, after setting the vertical deflection coil, the correction coil to the wall surface of the setting member which faces the screen, by the positioning fixing member.

28. (New) The method of Claim 27 wherein,

in the step for setting the correction coil, the correction coil is placed and set at a predetermined distance from the walls surface of the setting member which faces the screen.

REMARKS

The amendments to the specification, claims and newly drafted Claims 21-28 are in accordance with a Rule 34 Amendment submitted during the prosecution of the International Application. They are within the scope of the original invention and do not add any new subject matter.

If the Examiner believes that a telephone interview will help further the prosecution of this case, he is respectfully requested to contact the undersigned attorney at the listed telephone number.

Very truly yours,

PRICE AND GESS

Joseph W. Price, Reg. 251,24
2100 S.E. Main St., Ste. 250
Irvine, CA 92614
949/261-8433

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The paragraph beginning on page 1, line 21, has been amended as follows:

--As shown in this drawing, a bend-up-less type deflection yoke 6 is composed of a saddle-shaped horizontal deflection coil 11 mounted along the inner surface of an insulating frame 13, and a saddle-shaped vertical deflection coil 12 mounted along and sandwiched between the outer surface of the insulating frame 13 and a ferrite core 14, and the deflection yoke 6 has a structure in which an electron gun side bend portion 17 of the horizontal deflection coil 11 and the vertical coil 12 (the section in the drawing surrounded by a broken line) substantially lines the outer surface of a CRT funnel 4. Please note that reference numeral 15 in the drawing designates a correction coil which corrects so-called VCR (vertical coma residual) and side beams (R,B) vertical line horizontal mis-convergence that occurs and is provided on the outer surface slightly forward in the electron beam emission direction from a main lens 51 of an electron gun 5. Reference numeral 31 in the drawing designates a member for fixing the correction coil 15 known as a back cover or a small cover (hereafter "back cover 31"), the function of which will be described later.—

The paragraph beginning on page 7, line 16, has been amended as follows:

----FIG. 8 is a pattern drawing of vertical line horizontal mis-convergence which occurs in the side beams (R,B) [mis-convergence of vertical coma residual (VCR)];--

The paragraph beginning on page 7, line 18, has been amended as follows:

--FIG. 9 is a pattern drawing of mis-convergence of vertical coma residual (VCR) [vertical mis-convergence which occurs in the side beams (R,B);--

The paragraph beginning on page 12, line 20, has been amended as follows:

--Each correction coil 15 in the present mode, as shown in FIG. 7, is a conductive wire 24 wound around the U-shaped ferrite core 22, and generates a six-pole magnetic field synchronizing a vertical deflection and performs optimum correction of a VCR of a pattern shown in FIG. 9 [8]. In addition, other conductive wire is further wound around each of the correction coils 15, controlling the magnetic field of the conductive wire and, the correction coils 15 also performs the function of generating a four-pole magnetic field in the same cores 22 and correcting vertical line horizontal mis-convergence of side beams (R,B) shown in the pattern in FIG. 8 [9]. The working of the correction coil 15 itself is already well known, therefore an explanation will be omitted. However the correction coil 15 may be structured to correct either one or both of the above-described VCR and vertical line horizontal mis-convergence.—

The paragraph beginning on page 13, line 12, has been amended as follows:

--An E-shaped ferrite core 29, as shown in FIG. 10, having conductive wire 24 wound around each leg portion may be used as the correction coil 15. When this kind of E-shaped core 29 is used, as is shown in an example of the structure in FIG. 11, it is desirable to mount a correction coil 15 on both the right side and the left side as seen from the screen side. This case is the same as when the U-shaped core 22 is used in that the correction coil 15 can be constructed to correct the VCR and the vertical line horizontal mis-convergence of the side beams (R,B) by winding different conductive wires around the ferrite core 29 and controlling the magnetic field.--

The paragraph beginning on page 17, line 21, has been amended as follows:

--In addition, the applicable range of the present invention is not limited to self convergence system deflection yokes. Even in deflection yokes other than those of the self

convergence system, it is possible that it is necessary to set some kind of correction coil at the electron gun side bend portion of the deflection coil, and the technique of the present invention can be applied in such cases. Consequently, the correction coil 15 is not limited to correcting VCR and side beam vertical line horizontal mis-convergence, but can be applied to various correction coils.--

Claims 2, 13, 14, 16, 19, 20 have been cancelled without prejudice.

The claims have been amended as follows:

1. (Amended) A deflection yoke of a bend-up-less type comprising a saddle-shaped horizontal deflection coil, a saddle-shaped vertical deflection coil, an insulating frame, and a correction coil, the saddle-shaped horizontal deflection coil and the saddle-shaped vertical deflection coil being provided along, respectively, an inner and an outer surface of the insulating frame which insulates the deflection coils, and the correction coil being provided above the outer surface of an electron gun side bend portion of the deflection coils, wherein

a setting member is provided integrally formed in a fixed positional relation with respect to the insulating frame on the electron gun side and behind the bend portion of the deflection coils, and the correction coil is set at a fixed position by a positioning fixing member in front of [on] a wall surface of the setting member which faces the screen and above the outer surface of the electron gun side bend portion.

3. (Amended) The deflection yoke of Claim 1 [or 2] wherein

the positioning fixing member [correction coil] is structured to be freely detachable in relation to the setting member.

4. (Amended) The deflection member yoke of Claim 1 [or 2] wherein

the correction coil has (a) a core whose leg portion points in a direction toward the electron gun side bend portion of the deflection coil, and (b) a bobbin which covers the core and is conductive wire wound therearound; and [(c) a fixing member in a substantially fixed relation to the core; and

the correction coil is positioned by the fixing member being fixed to the setting member]

the positioning fixing member is set at a substantially fixed position in relation to the core.

5. (Amended) The deflection yoke of Claim 4 wherein

the setting member has a notch, and

the positioning fixing member has a claw portion which is interlocked with the notch.

7. (Amended) The deflection yoke of Claim 4 wherein

the positioning fixing member has a protruding portion which is inserted in an insertion aperture provided in the setting member.

8. (Amended) The deflection yoke of Claim 4 wherein

the positioning fixing member has a fitting portion which is fitted into a slot provided in the setting member.

9. (Amended) The deflection yoke of Claim 4 wherein

a flange portion is provided at both ends of the bobbin, an edge of each flange portion contacting [contacts] the setting member[, and positioning of the correction coil is performed in r elation to the setting member].

15. (Amended) A color picture tube having (a) an outer envelope composed of a front panel formed with a phosphor screen surface on an inner surface, and a funnel, (b) an electron gun provided in a neck portion of the funnel, and (c) a deflection yoke mounted on an outer surface of the funnel, wherein

the deflection yoke is of a bend-up-less type and comprises a saddle-shaped horizontal deflection coil, a saddle-shaped vertical deflection coil, an insulating frame, and a correction coil, the saddle-shaped horizontal deflection coil and the saddle-shaped vertical deflection coil being provided along, respectively, an inner and an outer surface of the insulating frame which insulates the deflection coils, and the correction boil being provided above the outer surface of an electron gun side bend portion of the deflection coils, wherein

a setting member is provided integrally formed in a fixed positional relation with respect to the insulating frame on the electron gun side and behind the bend portion of the deflection coils, and the correction coil is set at a fixed position by a positioning fixing member in front of [on] a wall surface of the setting member which faces the screen and above the outer surface of the electron gun side bend portion.

17. (Amended) The color picture tube of Claim 15 [or 16] wherein

the positioning fixing member [correction coil] is structured to be freely detachable in relation to the setting member.

18. (Amended) The color picture tube of Claim 15 [or 16] wherein the correction coil has (a) a core whose leg portion points in a direction toward the electron gun side bend portion of the deflection coil, (b) a bobbin which covers the core and is conductive wire wound therearound; and the positioning fixing member is set at a substantially fixed position in relation to the core [(c) a fixing member in a substantially fixed relation to the core; and the correction coil is positioned by the fixing member being fixed to the setting member].

New Claims 21-28 have been added.

SPECIFICATION

DEFLECTION YOKE AND COLOR PICTURE TUBE COMPRISING THE SAME

Technical Field

The present invention relates to a deflection yoke mounted in a color picture tube (hereafter "CRT") used, for instance, in a television set or a computer display, and a CRT which uses such a deflection yoke, and in particular the structure of the deflection yoke.

Background Art

Conventionally, amongst deflection yokes used in self-convergence systems which are mounted in in-line type CRTs, there are deflection yokes known as bend-up-less types. The following explains the structure of a conventional bend-up-less type deflection yoke. FIG. 1 is an outline cross section showing the structure of a conventional bend-up-less type deflection yoke schematically.

As shown in this drawing, a bend-up-less type deflection yoke 6 is composed of a saddle-shaped horizontal deflection coil 11 mounted along the inner surface of an insulating frame 13, and a saddle-shaped vertical

deflection coil 12 mounted along and sandwiched between the outer surface of the insulating frame 13 and a ferrite core 14, and the deflection yoke 6 has a structure in which an electron gun side bend portion 17 of the horizontal deflection coil 11 and the vertical coil 12 (the section in the drawing surrounded by a broken line) substantially lines the outer surface of a CRT funnel 4. Please note that reference numeral 15 in the drawing designates a correction coil which corrects so-called VCR (vertical coma residual) and side beams (R,B) vertical misconvergence that occurs and is provided on the outer surface slightly forward in the electron beam emission direction from a main lens 51 of an electron gun 5. Reference numeral 31 in the drawing designates a member for fixing the correction coil 15 known as a back cover or a small cover (hereafter "back cover 31"), the function of which will be described later.

Generally, the closer the placement position of a saddle-shaped deflection coil is to the electron gun side, the closer the deflection center is to the electron gun side, improving deflection sensitivity, and reducing the power needed to deflect the electron beam. As a result, deflection power can be reduced. Compared, for example, with bend-up type deflection yokes used conventionally,

in other words, deflection yokes with a structure in which the electron gun side bend portion of the deflection coil protrudes from the outer surface of the funnel, the placement position of the deflection coil of a bend-up-less type deflection yoke can be closer to the electron gun side. Therefore, bend-up-less type deflection yokes have the advantage of having higher deflection sensitivity and reduced deflection power compared with bend-up type deflection yokes. These bend-up-less type deflection yokes are particularly effective in broad deflection angle CRT apparatuses which have become commonly used in recent years. Consequently, the current situation is that bend-up-less type deflection yokes are used in almost all broad deflection angle CRT apparatuses.

Bend-up-less type deflection yokes have the advantages described above, but conventional bend-up-less type deflection yokes have a problem that there are cases in which the manufacturing process is inefficient because of the structure.

Namely, in bend-up-less type deflection yokes, when the correction coil 15 is placed on top of the electron gun side bend portion 17, a member for fixing and positioning the correction coil 15 must be provided protruding greatly above the electron gun side bend portion

17. This is because when the insulating frame 13 and the protruding member are integrally formed, the vertical deflection coil 12 must be inserted in the gap between the protruding member and the insulating frame 13 during assembly of the deflection yoke, making assembly impossible or extremely inefficient.

Subsequently, in conventional bend-up-less type deflection yokes, generally the back cover 31 shown in FIG. 1 is used as a component for fixing and positioning the correction coil 15 while avoiding interfering with the vertical deflection coil 12. The correction coil 15 is mounted on the back cover 31 in advance, and after the vertical coil 12 is mounted on the insulating frame 13, the fixing and positioning of the correction coil 15 is performed by inserting the back cover 31 from the electron gun side of the insulating frame 13.

However, when a bend-up-less type deflection yoke is manufactured using the back cover 31, the back cover 31 is an extra necessity. As a result the cost of the component and the process for applying the component cannot be avoided, giving rise to a problem of a necessary increase in the manufacturing cost.

The present invention comes about in view of the above problems, and has an objective of providing a deflection

yoke that is easily assembled particularly when assembling bend-up-less type deflection yokes and enables the manufacturing cost to be cut, and a CRT apparatus that uses such a deflection yoke.

Disclosure of the Invention

A deflection yoke of the present invention is a deflection yoke including a saddle-shaped horizontal deflection coil, a saddle-shaped vertical deflection coil, an insulating frame, and a correction coil, the saddle-shaped horizontal deflection coil and the saddle-shaped vertical deflection coil being provided along, respectively, an inner and an outer surface of the insulating frame which insulates the deflection coils, and the correction coil being provided above the outer surface of an electron gun side bend portion of the deflection coils, a setting member provided in a fixed positional relation with respect to the insulating frame on the electron gun side and behind the bend portion of the deflection coils, and the correction coil set at a fixed position on a wall surface of the setting member which faces the screen and above the outer surface of the electron gun side bend portion.

According to this construction, the correction coil

can be easily mounted after the vertical deflection coil has been mounted on the insulating frame, therefore in particular a bend-up-less type deflection yoke can be easily assembled.

Here, if the setting member is integrally formed with the insulating frame, there is no need to use a back cover which is used conventionally, meaning that as well as reducing component costs, the process to insert the back cover is unnecessary, so the manufacturing cost of the diffusion yoke can be reduced.

In addition, if the correction coil is structured to be freely detachable from the setting member, serviceability is convenient in the case that a fault occurs in the correction coil or either of the deflection coils.

Brief Description of the Drawings

FIG. 1 is an outline cross sectional view showing the structure of a conventional bend-up-less type deflection yoke;

FIG. 2 is an outline cross sectional view showing an example of the structure of a CRT apparatus to which the present invention is applied;

FIG. 3 is a perspective diagram showing an example

of the structure of the deflection yoke in one mode for carrying out the present invention;

FIG. 4 is a vertical section (the section showing the correction coil 15 is a side view) showing an outline of the structure of the deflection yoke 6 in one mode for carrying out the present invention;

FIG. 5 is a three-view drawing showing an example of the structure of the correction coil 15 in a mode for carrying out the present invention;

FIG. 6 is an enlarged view showing the section of the deflection yoke in a mode for carrying out the present invention that fixes the correction coil 15;

FIG. 7 is a drawing representing the state of the magnetic field of the correction coils 15 which use a U-shaped core;

FIG. 8 is a pattern drawing of mis-convergence of vertical coma residual (VCR);

FIG. 9 is a pattern drawing of vertical mis-convergence which occurs in the side beams (R,B);

FIG. 10 is a drawing representing the state of the magnetic field of the correction coils 15 which use an E-shaped core;

FIG. 11 is a perspective diagram showing an example of the structure of the deflection yoke 6 using an E-shaped

core;

FIG. 12 is a drawing representing the state of the magnetic field of the correction coils 15 which use a U-shaped core and an I-shaped core in combination;

FIG. 13 is a perspective diagram showing an example of the structure of the deflection yoke 6 using a U-shaped core and an I-shaped core in combination;

FIG. 14 is a perspective diagram showing an example of the structure of the deflection yoke 6 when the correction coil 15 is fixed by providing insertion apertures 31 in the plate 16 and inserting the tips of the fixing member 26 into the insertion apertures 31;

FIG. 15 is an enlarged drawing of the insertion aperture 31 portion; and

FIG. 16 is a perspective diagram showing an example of the deflection yoke 6 when the width of the portion of the plate 16 on which the correction coil 15 is mounted is narrower than the remainder.

Best Mode for Carrying Out the Invention

The following explains a best mode for carrying out the present invention based on the drawings.

FIG. 2 is an outline cross section showing an example

of a CRT apparatus to which the present invention is applied. In the CRT apparatus 1 shown in this figure an outer envelope is formed by a funnel 4 and a front panel 3 which has a fluorescent screen surface 2 on the inner surface, and an electron gun 5 which emits an electron beam 7 on the inner neck portion of the funnel 4 is provided. In addition, a deflection yoke 6 of the present invention is mounted along the outer surface of the neck portion of the funnel 4.

FIG. 3 is a perspective drawing showing an example of an outline of a structure of the deflection yoke 6 of a mode for carrying out the present invention. FIG. 4 is a cross section showing an outline of the structure of the deflection yoke 6 (the correction coil 15 section is a side view). Please note that the funnel 4, the electron gun 5, and the ferrite core 14 of the deflection yoke 6 of the CRT shown in FIG. 4 are omitted in FIG. 3.

The deflection yoke 6 of the present mode for carrying out the invention includes a saddle-shaped horizontal deflection coil 11 provided along the outer surface of the funnel 4, a vertical deflection coil 12 provided along the outer surface of the horizontal deflection coil 11, an insulating frame 13 which insulates the horizontal deflection coil 11 and the vertical deflection coil 12,

a ferrite core 14 provided on the outer periphery of the vertical deflection coil 12, and a correction coil 15 provided slightly forward in the electron beam emission direction above the outer surface of a main lens 51 of the electron gun 5, and the deflection yoke 6 is a bend-up-less type deflection yoke having a structure in which an electron gun side bend portion 17 (the section in the drawing surrounded by a broken line) substantially lines the outer perimeter of the CRT funnel 4.

In the present mode, a plate 16 almost parallel to the screen surface is provided integrally with the insulating frame 13 on the end of the electron gun side of the insulating frame 13 and the correction coil 15 is fixed to the screen side of the plate 16 (Below, the front side of the direction in which the electron beam progresses is called the "screen side" and the opposite direction is called the "electron gun side". The "electron gun side rear portion" means being further towards the electron gun side than the tip of the electron gun 5.). In this way, the positioning of the correction coil 15 at the screen side of the plate 16 is the gist of the invention. Please note that in the present mode the insulating frame 13 and the plate 16 are integrally formed. This is suitable for reducing manufacturing costs as the number of components

can be reduced, but the insulating frame 13 and the plate 16 may be made as separate members and assembled in advance of mounting the correction coil 15, for example before mounting the vertical deflection coil 12. Even by this method the effect that the deflection yoke 6 can be manufactured more easily compared to conventional methods can be obtained.

In the present mode, correction coils 15 are fixed at the top and the bottom, as seen from the screen, provided above the outer surface of the electron gun side bend portion 17 protruding from the plate 16, while being freely detachable from the plate 16.

FIG. 5 is a three-view drawing showing an example of the structure of the correction coil 15 in the present mode. The correction coil 15 is formed from a U-shaped core 22 made from ferrite and having both legs pointing towards the electron gun side bend portion 17, a bobbin 23 mounted substantially in the center of the bottom portion of the U-shaped core 22, opposing flange portions 25 provided set on either side of the bobbin 23, and fixing members 26 provided on either side of the bottom portion of the U-shaped core 22. A conductive wire, which is not shown in FIG. 5, is wound around the bobbin 23 in order to form the correction coil 15. Please note that in the present

mode, the fixing member 26 is made of plastic and is fixed to the U-shaped core 22 with an adhesive.

Returning to FIG. 3, in the correction coil 15 in the present mode, the correction coil 15 and the plate 16 are fixed by the flange portions 25 contacting the screen side of the plate 16 and regulating the distance of the correction coil 15 from the plate 16, and claw portions 27 which are provided on the ends of the fixing members 26 being attached with a rectangular notch portions 28 which are provided on the edge of the plate 16. FIG. 6 is an enlarged view of the section where the notch portion 28 and the claw portion 27 interlock. In the present mode, the provision of the flange portions 25 makes the positioning of the correction coil 15 easy, but according to, for instance, the material of the fixing member 26, it is possible that the placement of the correction coil 15 may be possible by the interlocking of the claw portions 27 and the notch portions 28. In such cases it may not be necessary to provide the flange portions 25.

Each correction coil 15 in the present mode, as shown in FIG. 7, is a conductive wire 24 wound around the U-shaped ferrite core 22, and generates a six-pole magnetic field synchronizing a vertical deflection and performs optimum correction of a VCR of a pattern shown in FIG. 8.

In addition, other conductive wire is further wound around each of the correction coils 15, controlling the magnetic field of the conductive wire and, the correction coils 15 also performs the function of generating a four-pole magnetic field in the same cores 22 and correcting vertical mis-convergence of side beams (R,B) shown in the pattern in FIG. 9. The working of the correction coil 15 itself is already well known, therefore an explanation will be omitted. However the correction coil 15 may be structured to correct either one or both of the above-described VCR and vertical mis-convergence.

An E-shaped ferrite core 29, as shown in FIG. 10, having conductive wire 24 wound around each leg portion may be used as the correction coil 15. When this kind of E-shaped core 29 is used, as is shown in an example of the structure in FIG. 11, it is desirable to mount a correction coil 15 on both the right side and the left side as seen from the screen side. This case is the same as when the U-shaped core 22 is used in that the correction coil 15 can be constructed to correct the VCR and the vertical mis-convergence of the side beams (R,B) by winding different conductive wires around the ferrite core 29 and controlling the magnetic field.

In addition, as shown in FIG. 12, the correction coil

15 may be constructed by combining the U-shaped core 22 and an I-shaped core 30. In this case, for example, the correction coils 15 can be mounted as shown in FIG. 13 in an example of the construction.

Please note that, as explained above, the structure in which the notch portion 28 and the claw portion 27 are interlocked at the edge of the plate 16 is merely one example of mounting the correction coil 15 on the plate 16 in the deflection yoke 6 of the present invention, and many other methods of mounting are possible. For example, as shown in FIG. 14, insertion apertures 31 may be provided in the plate 16, and claw portions 27 provided at the tips of the fixing member 26 may be interlocked in the notch portions 28 provided in the insertion apertures 31. FIG. 15 is an enlarged drawing of the area around one insertion aperture 31 when the insertion apertures 31 are provided. Furthermore, it is possible to insert the tips of the fixing member 26 into the insertion aperture 31 and fix the fixing member 26 and the plate 16 without providing claw portions 27, or the correction coil 15 can be fixed by providing a slit in the plate 16 and inserting the fixing member 26.

Furthermore, providing a claw portion 27 and so on and constructing the correction coil 15 and the plate 16 to be freely detachable makes it possible to replace only

one part in case, for example, a fault occurs in either the correction coil 15 or the deflection coil, making serviceability of the CRT apparatus convenient. However, the structure is not limited to the above-described examples, but the structure may be such that the members that mount the correction coil 15 may be affixed to the plate 16 by an adhesive. This is because even this method allows for easy manufacturing of a deflection yoke.

In addition, even when an I-shaped core 30 as shown in FIG. 13 is not used, as shown in FIG. 16, if the width of the portion of the plate 16 on which the correction coil 15 is mounted is made narrower than the remainder, it is possible to conserve the material used to form the plate 16. Of course, it is possible to make the size of the plate 16 itself smaller than that shown in the drawing. Please note that the above-described examples of variations example may of course be applied in the same way when the E-shaped ferrite core 29 is used or combined with the I-shaped ferrite core 30.

Next, an example of the present invention being applied to a 46cm (19 inch), 100 degree deflection angle type display use CRT apparatus will be explained.

The CRT tube axis direction is referred to as the Z axis, and the direction along the Z axis toward the screen

is the positive direction. The position at the rear tip of the electron gun side end of the horizontal deflection coil 11 and the vertical deflection coil 12 is considered to be Z=0. If the electron gun side bend portion 17 of the vertical deflection coil 12 is within a range of Z=0 to 8mm and the plate 16 has for example a thickness of 2mm and is set in a position Z=-2 to 0mm, then, by fixing the correction coil 15 in a range of Z=2 to 4mm, the correction coil 15 is placed on the upper portion of the electron gun side bend portion 17.

As explained above, by using the deflection yoke of the present invention, it is possible to assemble a bend-up-less type deflection yoke with ease. Furthermore, if the insulating frame 13 and the plate 16 are integrally formed, a back cover which is a separate member to the insulating frame 13 that is considered to be necessary in conventional bend-up-less deflection yokes is not used, and the same fixing function as conventional correction coils can be had. Furthermore, the correction coil 15 can be set in any position by adjusting, for instance, the size of the fixing member 26 or the flange portions 25.

Please note that in the present mode, the plate 16 was used as the member for fixing the correction coil 15, but this member is not limited to a plate. Any shape is

acceptable if the member is able to fix the correction coil 15 in an appropriate position.

Furthermore, in the above-described mode, the correction coil 15 and the core 22 and so on were affixed to the fixed member 26 with an adhesive, but numerous variations are possible. For example, the correction coil 15 can be made from a component consisting of, for instance, the fixing member 26 and the flange portions 25 or the bobbin 23 integrated, and the ferrite core and the conductive wire.

Furthermore, in the above-described mode, the present invention was explained in detail when applied to a bend-up-less type deflection yoke, but the range of the present invention is not limited to a bend-up-less type deflection yoke. If the technique of the present invention is used, it is possible to place the correction coil closer to the screen side than the plate even in a bend-up type deflection yoke. This is effective when it is undesirable for the electromagnetic field of the correction coil to be leaked to the electron gun side.

In addition, the applicable range of the present invention is not limited to self convergence system deflection yokes. Even in deflection yokes other than those of the self convergence system, it is possible that

it is necessary to set some kind of correction coil at the electron gun side bend portion of the deflection coil, and the technique of the present invention can be applied in such cases. Consequently, the correction coil 15 is not limited to correcting VCR and side beam vertical misconvergence, but can be applied to various correction coils.

Industrial Application

The deflection yoke and the CRT apparatus of the present invention can be applied, for instance, to a television set or a computer display which uses particularly broad deflection angle CRT apparatus.

Claims

1. A deflection yoke comprising a saddle-shaped horizontal deflection coil, a saddle-shaped vertical deflection coil, an insulating frame, and a correction coil, the saddle-shaped horizontal deflection coil and the saddle-shaped vertical deflection coil being provided along, respectively, an inner and an outer surface of the insulating frame which insulates the deflection coils, and the correction coil being provided above the outer surface of an electron gun side bend portion of the deflection coils, wherein

a setting member is provided in a fixed positional relation with respect to the insulating frame on the electron gun side and behind the bend portion of the deflection coils, and the correction coil is set at a fixed position on a wall surface of the setting member which faces the screen and above the outer surface of the electron gun side bend portion.

2. The deflection yoke of Claim 1 wherein

the setting member and the insulating frame are integrally formed.

3. The deflection yoke of Claim 1 or 2 wherein

the correction coil is structured to be freely detachable in relation to the setting member.

4. The deflection yoke of Claim 1 or 2 wherein

the correction coil has (a) a core whose leg portion points in a direction toward the electron gun side bend portion of the deflection coil, (b) a bobbin which covers the core and is conductive wire wound therearound, and (c) a fixing member in a substantially fixed relation to the core; and

the correction coil is positioned by the fixing member being fixed to the setting member.

5. The deflection yoke of Claim 4 wherein

the setting member has a notch, and

the fixing member has a claw portion which is interlocked with the notch.

6. The deflection yoke of Claim 5 wherein

the setting member has a plate form,

the notch is provided on an edge of the setting member, and

a portion of the setting member in which the notch

is provided is formed so as to have a narrower width than an electron gun side back vicinity of the electron gun side bend portion.

7. The deflection yoke of Claim 4 wherein the fixing member has a protruding portion which is inserted in an insertion aperture provided in the setting member.

8. The deflection yoke of Claim 4 wherein the fixing member has a fitting portion which is fitted into a slot provided in the setting member.

9. The deflection yoke of Claim 4 wherein a flange portion is provided at both ends of the bobbin, an edge of each flange portion contacts the setting member, and positioning of the correction coil is performed in relation to the setting member.

10. The deflection yoke of Claim 4 wherein the core is a U-shaped core, both of whose leg portions point in the direction toward the electron gun side bend portion of the deflection coil, and the bobbin covers substantially a center portion of the U-shaped core.

11. The deflection yoke of Claim 4 wherein

the core is an E-shaped core, each of whose leg portions points in the direction toward the electron gun side bend portion of the deflection coil, and one bobbin covers each of the leg portions of the E-shaped core.

12. The deflection yoke of Claim 4, wherein

the core includes a U-shaped core both of whose leg portions point in the direction toward the electron gun side bend portion of the deflection coil, and an I-shaped core which has one end pointing towards the electron gun side bend portion direction of the deflection coil; and one bobbin covers each of substantially a center portion of the U-shaped core, and the I-shaped core.

13. The deflection yoke of Claim 1 or 2 wherein

the correction coil generates a magnetic field which corrects at least one of mis-convergence according to coma residual, and vertical mis-convergence which occurs in a side beam of an in-line type electron gun.

14. The deflection yoke of Claim 13 wherein

the correction coil has two conductive wires, and

both mis-convergence according to coma residual and vertical mis-convergence which occurs in a side beam of an in-line type electron gun are corrected by magnetic fields which are generated respectively by the two conductive wires and controlled.

15. A color picture tube having (a) an outer envelope composed of a front panel formed with a phosphor screen surface on an inner surface, and a funnel, (b) an electron gun provided in a neck portion of the funnel, and (c) a deflection yoke mounted on an outer surface of the funnel, wherein

the deflection yoke comprises a saddle-shaped horizontal deflection coil, a saddle-shaped vertical deflection coil, an insulating frame, and a correction coil, the saddle-shaped horizontal deflection coil and the saddle-shaped vertical deflection coil being provided along, respectively, an inner and an outer surface of the insulating frame which insulates the deflection coils, and the correction coil being provided above the outer surface of an electron gun side bend portion of the deflection coils, wherein

a setting member is provided in a fixed positional relation with respect to the insulating frame on the

electron gun side and behind the bend portion of the deflection coils, and the correction coil is set at a fixed position on a wall surface of the setting member which faces the screen and above the outer surface of the electron gun side bend portion.

16. The color picture tube of Claim 15 wherein the setting member and the insulating frame are integrally formed.

17. The color picture tube of Claim 15 or 16 wherein the correction coil is structured to be freely detachable in relation to the setting member.

18. The color picture tube of Claim 15 or 16 wherein the correction coil has (a) a core whose leg portion points in a direction toward the electron gun side bend portion of the deflection coil, (b) a bobbin which covers the core and is conductive wire wound therearound, and (c) a fixing member in a substantially fixed relation to the core; and

the correction coil is positioned by the fixing member being fixed to the setting member.

19. The color picture tube of Claim 15 or 16 wherein the correction coil generates a magnetic field which corrects at least one of mis-convergence according to coma residual, and vertical mis-convergence which occurs in a side beam of an in-line type electron gun.

20. The color picture tube of Claim 19 wherein the correction coil includes two conductive wires, and both mis-convergence according to coma residual and vertical mis-convergence which occurs in a side beam of an in-line type electron gun are corrected by magnetic fields which are generated respectively by the two conductive wires and controlled.

ABSTRACT

A deflection yoke easily produced at low cost, comprising saddle-shaped horizontal and vertical deflection coils (11, 12) provided along the inner and outer faces of an insulating frame (13) and a correction coil (15) provided above the outer peripheral surfaces of the bent portions on the electron gun side of the deflection coils, wherein a setting member (16) is provided in a fixed relation with respect to the insualting frame (13) on the electron gun side and behind the bent portions on the electron gun side of the deflection coils, and the correction coil (15) is on the wall of the setting member (16), facing the screen.

FIG.1

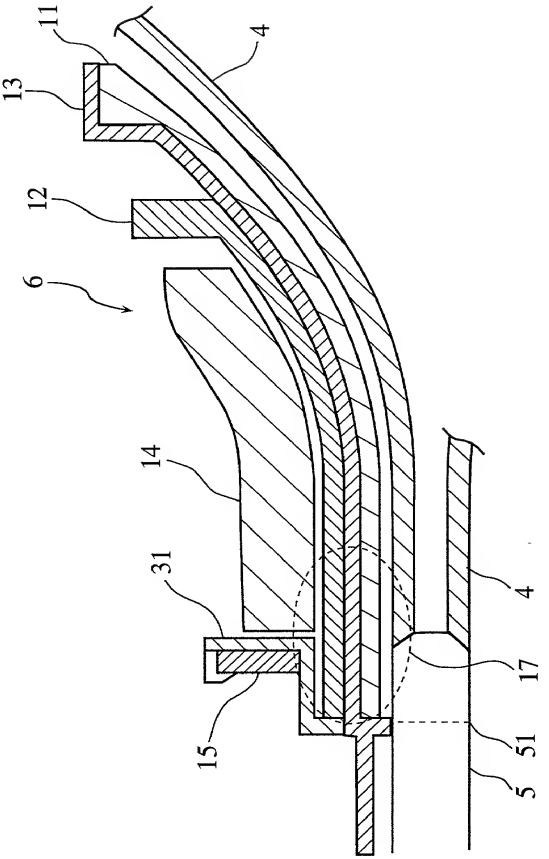


FIG.2

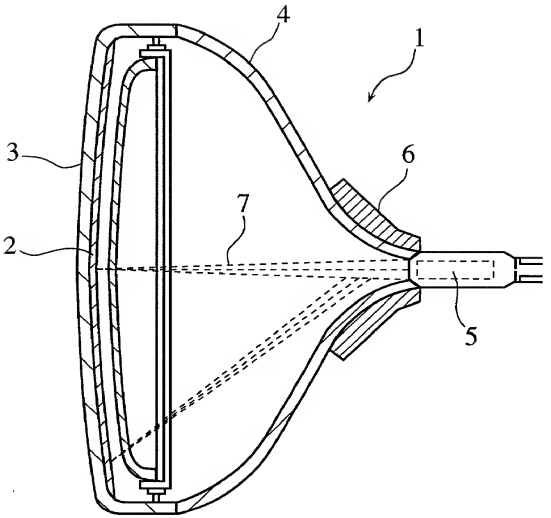


FIG.3

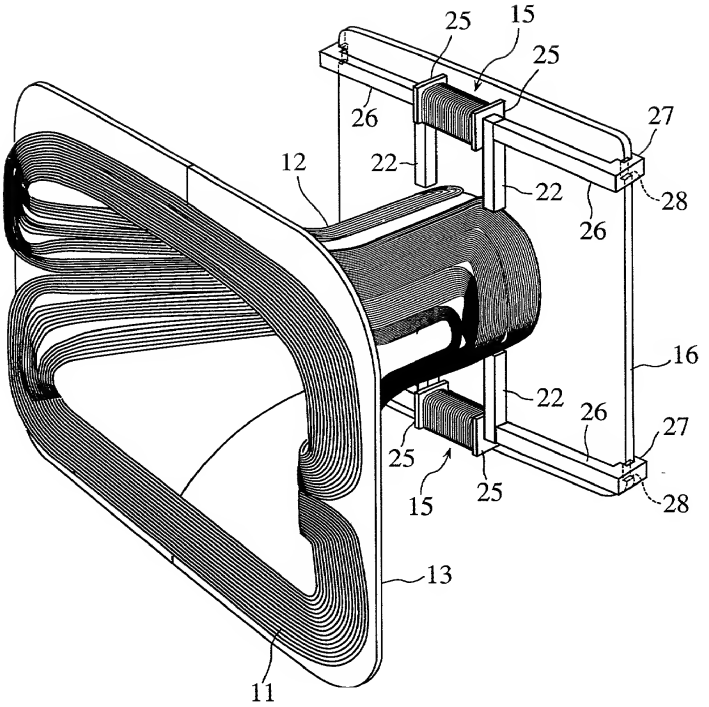


FIG.4

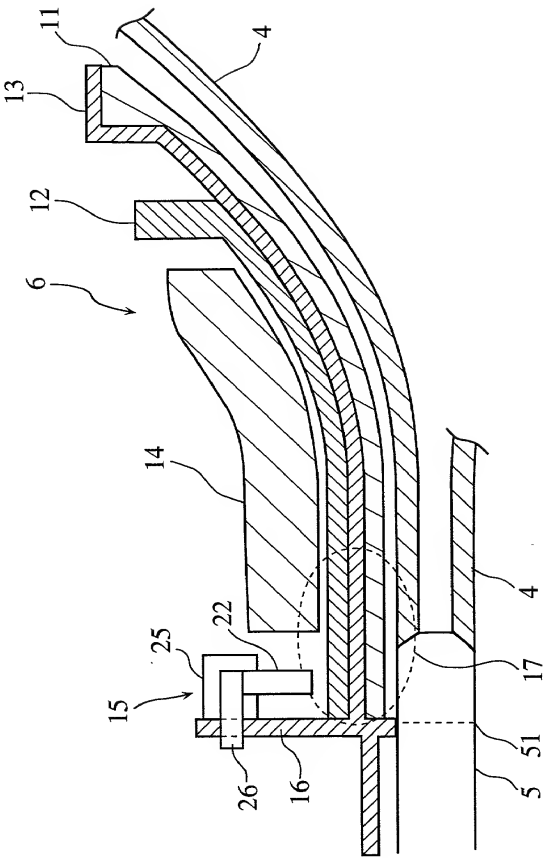
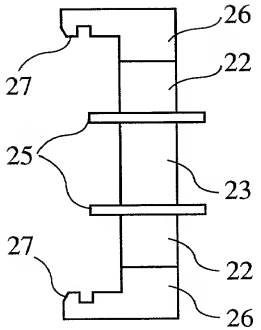
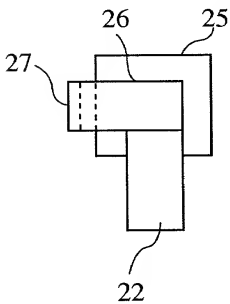


FIG.5





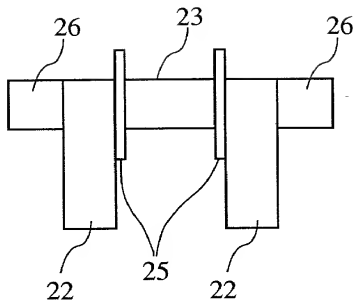


FIG.6

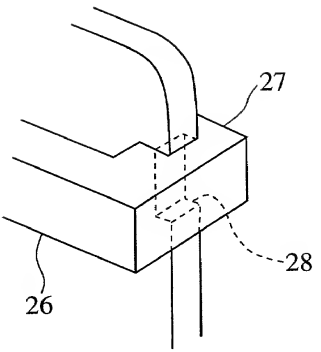


FIG.7

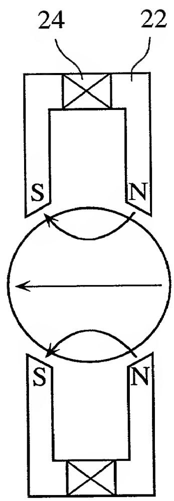


FIG.8

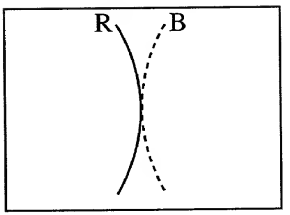


FIG.9

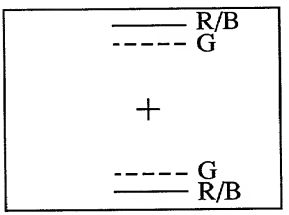


FIG.10

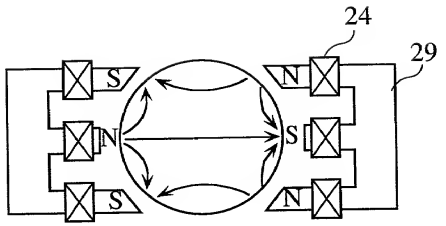


FIG.11

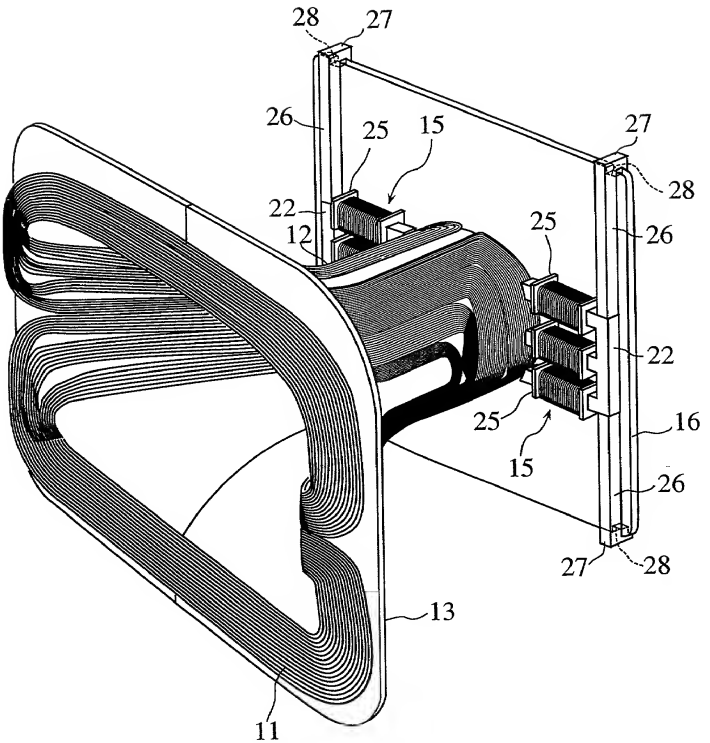


FIG.12

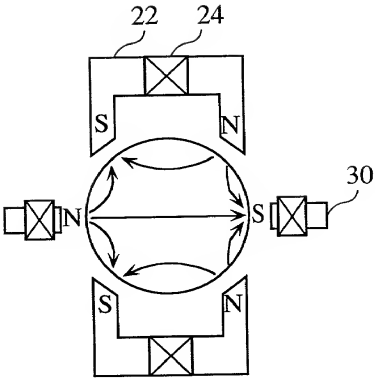


FIG.13

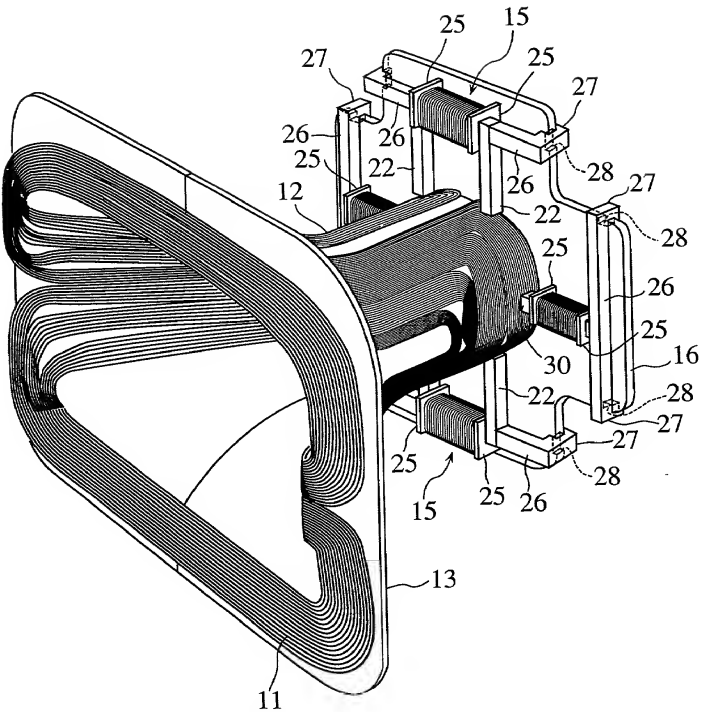

25
15
27
25
27
26
26
25
22
26
28
27
12
22
28
25
26
25
16
30
22
28
27
27
25
28
15
25
26
13
11

FIG.14

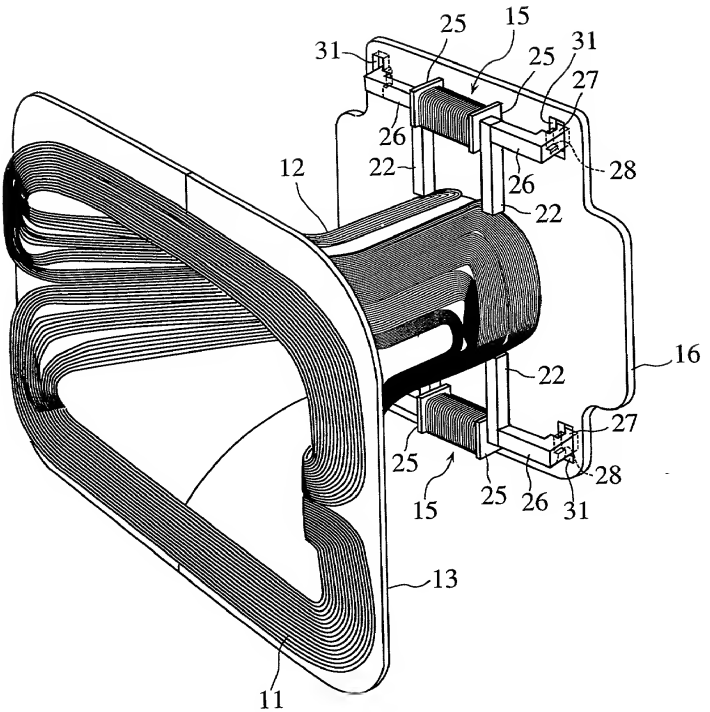


FIG.15

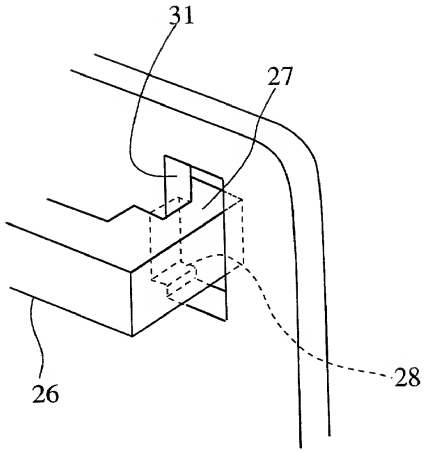
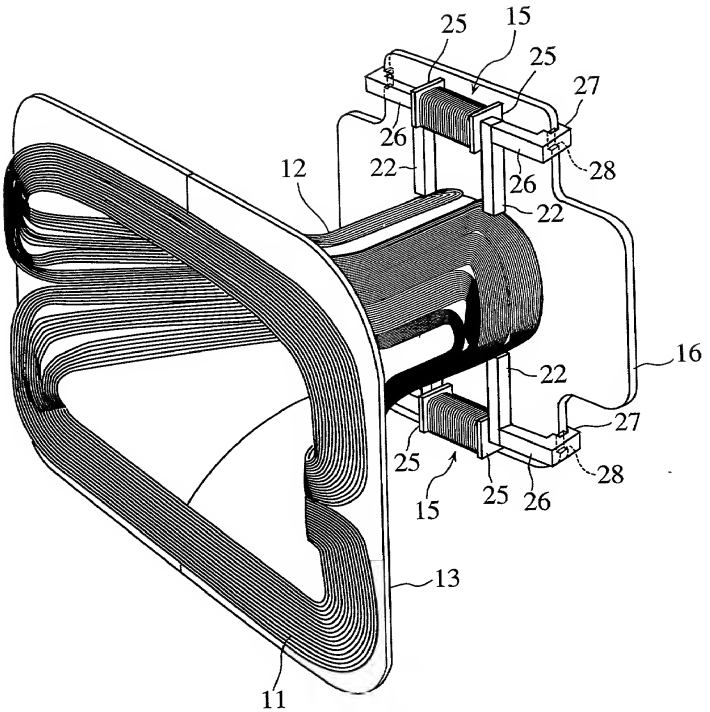


FIG.16



Docket No.
NAK1-B068

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

DEFLECTION YOKE AND COLOR PICTURE TUBE COMPRISING THE SAME

the specification of which

(check one)

☐ is attached hereto.

☐ was filed on 29/10/1999 as United States Application No. or PCT International Application Number PCT/JP99/06001 and was amended on 24/08/2000 (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)			Priority Not Claimed
10-318712	Japan	10/11/1998	☐
(Number)	(Country)	(Day/Month/Year Filed)	
			☐
(Number)	(Country)	(Day/Month/Year Filed)	
			☐
(Number)	(Country)	(Day/Month/Year Filed)	

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

Joseph W. Price, Reg. No. 25,124
Albin H. Gess, Reg. No. 25,726
Franklin D. Ubell, Reg. No. 27,009
Doyle B. Johnson, Reg. No. 39,240
Michael J. Moffatt, Reg. No. 39,304
Bradley D. Blanche, Reg. No. 38,387

Send Correspondence to: **Joseph W. Price**
PRICE, GESS & UBELL
2100 S.E. Main St., Ste. 250
Irvine, CA 92614

Direct Telephone Calls to: *(name and telephone number)*
Joseph W. Price, 949/261-8433

Full name of sole or first inventor	Etsuji TAGAMI
Sole or first inventor's signature	Etsuji Tagami — Date 25/04/2001
Residence	14-3, Chiyodacho, Takatsuki-shi, Osaka 569-0087 Japan JPX
Citizenship	Japan
Post Office Address	same as residence

Full name of second inventor, if any	
Second inventor's signature	Date
Residence	
Citizenship	
Post Office Address	